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# DURATION OF POST-HYPNOTIC SUGGESTION

A DISSERTATION SUBMITTED TO THE GRADUATE FACULTY IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

By

EVERETT FRANK PATTEN

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# THE DURATION OF POST-HYPNOTIC SUGGESTION

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THE problem of this investigation is the relation of a post-hypnotic suggestion to varying intervals of time. Only two experimental attacks have been made upon this problem. Hull [2] reports that Ludden studied the retention of post-hypnotic suggestion by pneumographically recording the breathing of his subjects as they read. These subjects had been hypnotized previously and told that they should breathe twice as fast as normal when they were reading from even numbered pages of a certain book and half as fast as normal when they were reading from the odd numbered pages. The results of this study are not reported by Hull. A somewhat modified use of the same general technique was made by Kellogg,[3] working under Hull's direction. In general Miss Kellogg found that the power of the post-hypnotic suggestion steadily decreases during the first three weeks after it is given, but that after the first sharp fall obedience to the suggestion may continue indefinitely. She further found that practice tends to increase the influence of post-hypnotic suggestion. The element of repeated testing somewhat obscures the above-mentioned results. It seems that the initial testing occurred almost immediately for all subjects. Some were retested daily, and some at longer intervals. This practice may have operated to fixate the response.

An effort was made to avoid this sort of practice effect in our study. With all time intervals investigated, ranging all the way from immediate testing—the zero interval—up to thirty-three days, there was no intervening practice.

Our subjects were told, during hypnosis, that they were later to be tested by being presented with a series of words and that they were to respond with a downward pressure of the right fore-

[1] The writer wishes to acknowledge his indebtedness to Professor Harvey A. Carr, of the University of Chicago, for his aid in the pursuance of this study.

[2] Hull, Clark L. "The Application of Quantitative Experimental Methods to Hypnotic Phenomena," Psy. Bul., 1927, pp. 24, 194. Raymond H. Ludden's study is in the form of an unpublished thesis in the University of Wisconsin Library.

[3] Kellogg, E. R. *Duration of the effects of post-hypnotic suggestion.* J. Exper. Psychol., 1929, 12, 502–514. A copy of the manuscript was kindly loaned by Dr. Hull. For this and many other friendly acts of assistance, the writer is grateful.

finger to each name of a specified class of objects, for example, animals, but that they were to make no response to the other words.

Our method of procedure, then, was as follows: The subject was first brought into the experimental room for two days and was presented with a series of thirty words in order to familiarize him with the general test conditions. He was then hypnotized in another room and given the post-hypnotic suggestion just described. Then, after the required time interval, he was again brought into the experimental room and tested. He was presented with a list of thirty words at intervals of two seconds, as in the preliminary practice. This list contained three of the stimulus words to which he had been instructed to react, distributed at random within it. This list also contained one word which was repeated. The first appearance of this word was near the begining of the list and its repetition near the end, after the last of the three stimulus words. The subject was now told, as in the preliminary practice periods, that the list contained one repeated word and that he was to observe each item in the list carefully so as to be able to report this repeated word when the exposure of the list was completed. The detection of this repeated word constituted the subject's conscious task and it was required of him to make the testing procedure seem plausible, as well as to keep him attentive and active throughout the exposure of the list.

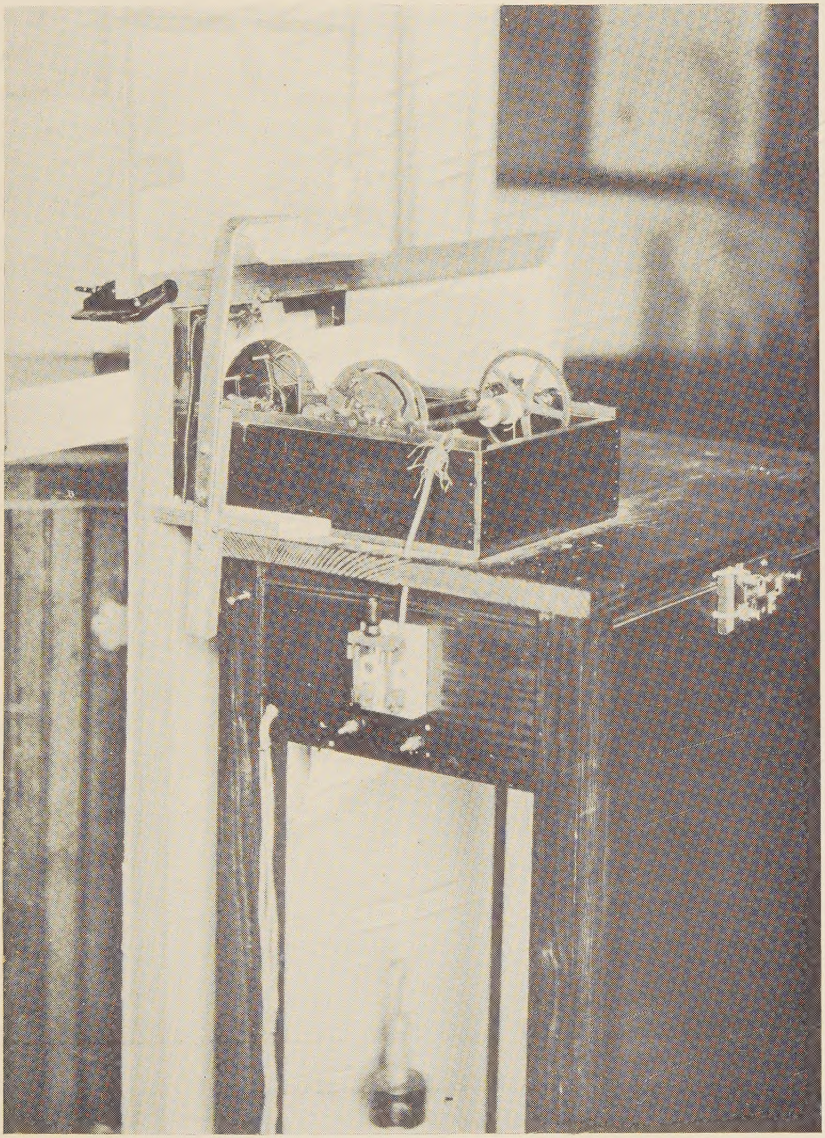
The duties of each subject were, then, as follows:

1. To observe the list of thirty words and detect the repeated word. This was his conscious task.
2. To depress his finger automatically on the appearance of the three stimulus words. This was the hypnotically suggested task.

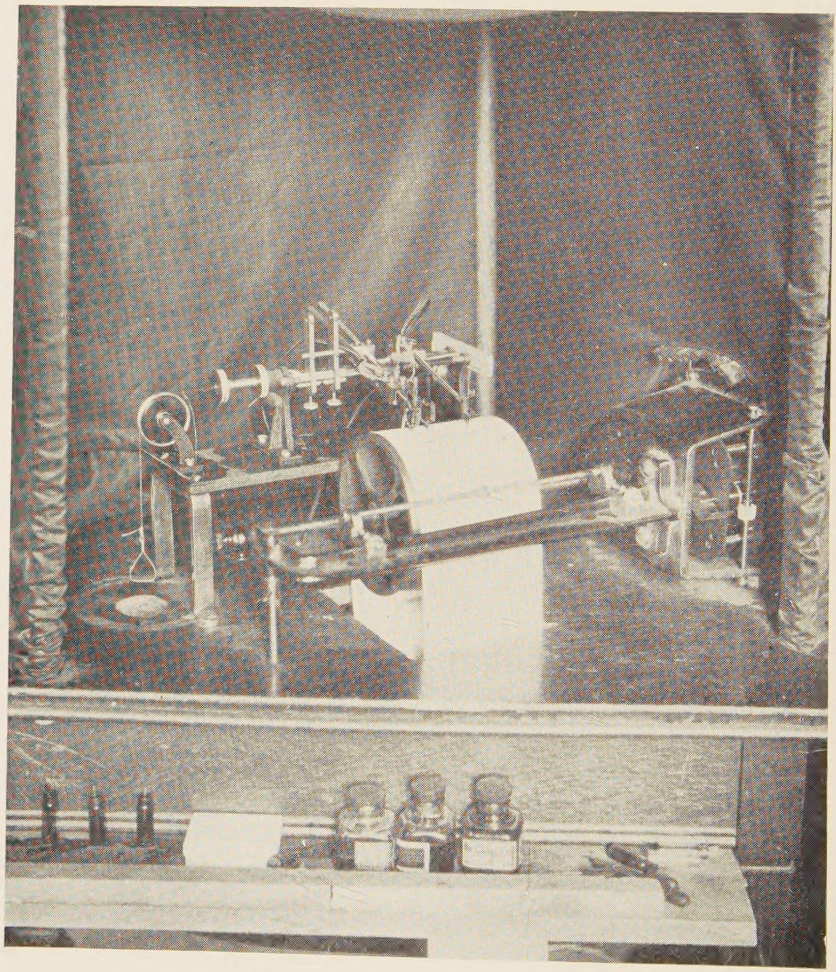
In the main experiment, the subjects were all tested on the same list the first day. This list contained the names of three different animals as stimulus words. On the second day, another list, containing different neutral words, three different names of animals, and a different repeated word, was used. In no case was any subject tested twice on the same list; in consequence he never reacted twice to the same stimulus word.

The exposure apparatus was Hull's memory machine[4] and it consisted of a horizontal drum driven by a clockwork in such a way that its motion was intermittent, exposing each word for two

[4] Hull, Clark L. "Quantitative Aspects of the Evolution of Concepts." Psychological Monographs, No. 123. Vol. XXVIII, p. 12.



MEMORY MACHINE OR EXPOSURE APPARATUS



RECORDING APPARATUS

seconds. Hanging from this drum was a removable oil-cloth belt, on the fabric side of which was typed a list of the sort described.

The suggested reaction was a downward pressure of the right forefinger, with the sight of the hand screened from the subject. The following apparatus was employed to record the presence, extent, duration, and speed of the response.

A small metal stirrup received the tip of the finger. This was suspended by a cord which led up over a pulley and thence horizontally to a sliding carriage. The carriage was held between two stretched coil springs in such a way that downward pressure in the stirrup was against a slight tension. Since the stirrup was suspended thirty-five millimeters from the stable, the maximum extent of the finger movement was that amount. Projecting from the sliding carriage was an arm carrying a small glass stylographic pen which recorded the response upon the polygraph paper. Equally spaced metal pegs around the circumference of one end of the memory drum completed a momentary electric circuit by brushing over a spring every time the drum revolved enough to bring a new word into position. These contacts actuated the magnet which operated a stylographic pen and graphically recorded, with relative accuracy, the time of exposure of each word. A third pen was in circuit with a concealed key, by means of which the operator could record the appearance of the stimulus words.

Two sample records are shown in Plate 1. The bottom line in each case represents the operator's record. The first of each pair of responses shows the beginning of the exposure of a stimulus word, and the second, following after an interval of about six millimeters, the end of that exposure. The middle lines record the time of exposure of the various words of the lists. The upper tracings on each record represent the extent and duration of the subject's reaction. The speed of the response can be estimated with some degree of accuracy by comparing the beginning of the reaction with the line giving the corresponding time of exposure.

Twenty-two hypnotic subjects were tested, seventeen men and five girls. These were all college students selected from those who volunteered for the experiment. Only those were chosen in whom we could induce what we regarded as deep hypnosis.

Effort was made to prevent the subjects from being conditioned to the test room and to the operator. The suggestion was given in another than the test room, as has been indicated. The operator was completely screened from the subject during the test, and, as an additional check along this line, another experimenter tested

the subjects on four different occasions. Inasmuch as these reactions were similar to those on days immediately preceding and following, it is evident that the results were not due to the operator.

After the hypnotic subjects had been tested for the last time, they were quizzed as to their knowledge of what had occurred. The subject was first asked if his finger had moved. Eleven had no knowledge and eleven claimed knowledge of finger movement. The next question was as to the occasion for the movement. Of the eleven who denied knowledge, three said

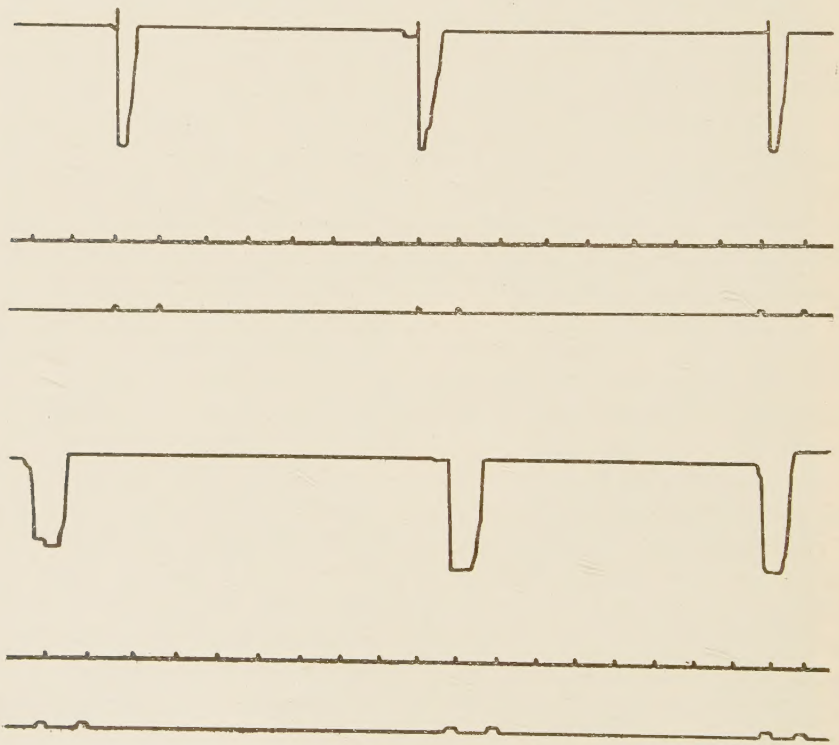


PLATE I

that if the finger had moved, it was because of the appearance of the repeated word, six ascribed no reason, one said nervousness, and one, fatigue. Two of those claiming knowledge could ascribe no reason for the movement, two said it was because of the repeated word, two said that the appearance of "some" word caused it, and five gave as the reason, the appearance of the name of an animal. Finally they were quizzed as to whether they had any knowledge of the instructions given during

hypnosis. Eighteen denied any memory for these instructions and four claimed it. Of the eighteen who claimed no knowledge of instructions, seven claimed knowledge of movement.

On the basis of the replies to the third question, the subjects were divided into two groups, the eighteen who denied knowledge and the four who reported memory for the instructions. The results from these two groups will be reported separately.

For purposes of control, sixteen non-hypnotic subjects were tested. The procedure was the same as previously described. They were given a preliminary practice to acquaint them with the experimental set-up, were then taken into another room as were the hypnotic subjects, and told that when they were tested they should respond by pressing downward on the presentation of a name of a specified class of objects, viz., animals. The procedure was exactly the same as before outlined except that in the one case the subject received his instructions while in a deep trance and in the other while he was fully conscious. Each control was paired off against one of the amnesic subjects (except those with the zero time interval) and was of the same sex, and as nearly equal in scholastic attainments, age, and personality traits as possible.

We have comparative records, then, from:

1. Eighteen amnesic, hypnotized subjects
2. Four non-amnesic, hypnotized subjects
3. Sixteen normal or conscious subjects.

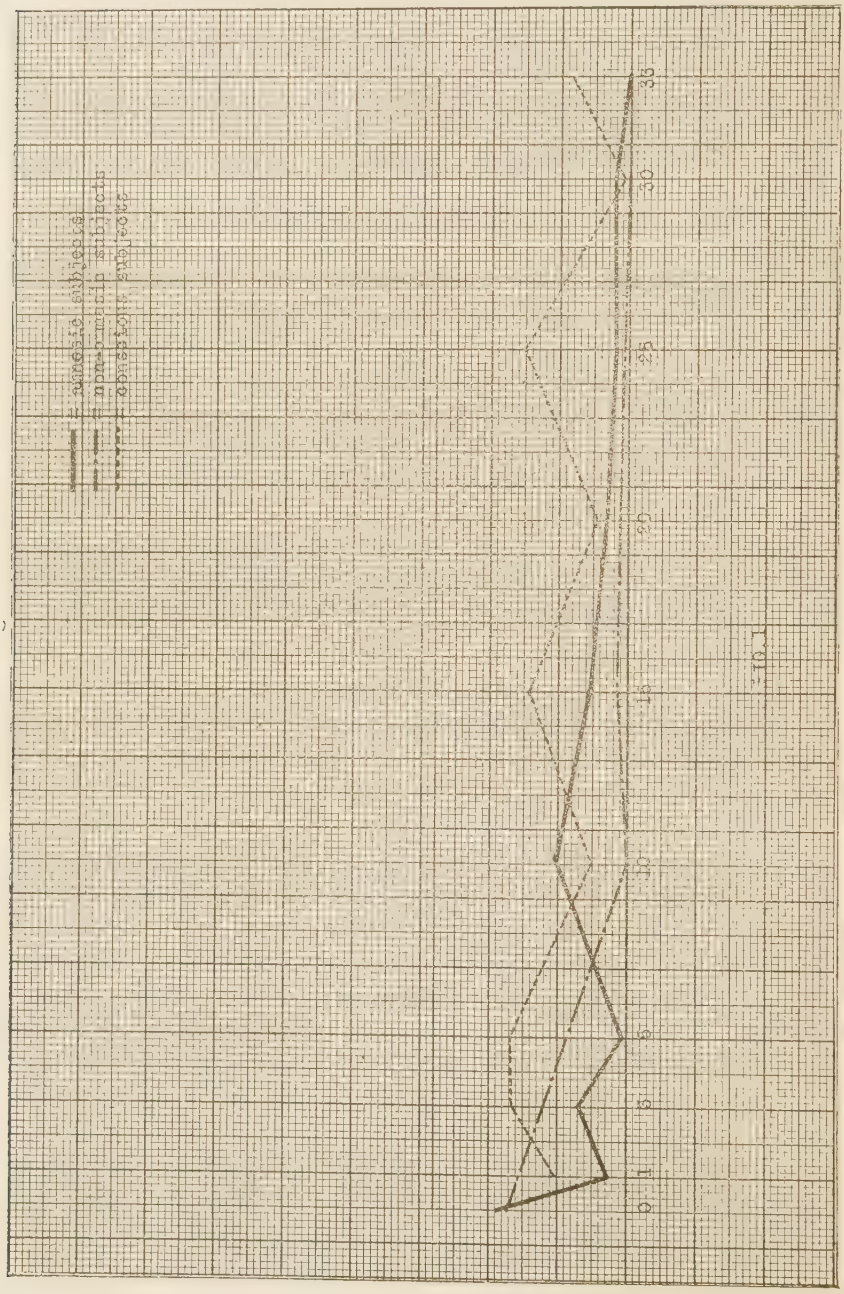
### THE RELATIONSHIP OF THE RESPONSE TO TIME

(1) The Magnitude of the Response. The relation of the magnitude of the response to time for the three groups is graphically represented in the retention curves given in Fig. 1.

The values along the abscissa represent the time intervals for which retention was tested. The upper horizontal line shows the maximum possible response and is given in all the forthcoming graphs. The height of the curves represents the average magnitude of the various responses for each interval of time. The number of responses per individual was always six but the number of individuals tested varied somewhat with the time interval.

The solid line represents the amnesic subjects. Two individuals were tested on the zero interval, two on the one, two on the three, two on the five, two on the ten, two on the fifteen, two on the twenty, two on the twenty-five, one on the thirty, and one on the thirty-three day interval.

The broken line composed of alternate long and short dashes


suggested subjects
non-suggested subjects
doubtful subjects
35
30
25
20
15
10
5
0

represents the reactions of the non-amnesic subjects. Since there were but four of these, one on the zero interval, one on the ten day, one on the fifteen, and one on the thirty day interval, the results are not statistically reliable.

The results from the normal subjects are shown by the line composed of short dashes. Two individuals were tested on the one day interval, two on the three, two on the five, two on the ten, two on the fifteen, two on the twenty, two on the twenty-five, one on the thirty and one on the thirty-three day interval.

The following conclusions may be drawn from these graphical data:

1. The magnitude of the response of the amnesic subjects decreases with time.
2. The magnitude of the response of the conscious subjects decreases somewhat with time.
3. The average magnitude of response is always less than the maximum possible response even at the zero interval.
4. The reactions of the amnesic subjects are not as large nor as persistent as those of the conscious subjects and they exhibit a somewhat faster decrement with time.
5. The non-amnesic subjects show retention up to fifteen days but the magnitude of the responses is less than for the other groups.

(2) Failure to Respond. The records show many failures to react to the stimulus word. These were incorporated in the previous averages as zero magnitudes. We also tabulated these data separately to discover whether the number of these failures varied with the time interval and with the group. Because the number of possible reactions varies, we tabulated these data in terms of percentages of failure to react for three groups of successive time intervals. These percentage data are given in Table 1.

TABLE I

PERCENTAGE OF FAILURES TO REACT

| Group of subjects | First third | Second third | Last third | Average of all time intervals |
|---|---|---|---|---|
| Amnesic . . . . . | 18.1 | 16.6 | 62.5 | 23.4 |
| Non-amn. . . . . | 18.5 | 16.6 | 100. | 25.8 |
| Control . . . . . | 35.4 | 48.5 | 25. | 35.4 |

The following facts are revealed by the above table:

1. For the hypnotic subjects, the frequency of failures materially increases for the longer intervals, while for the controls, the larger number of failures occurs in the first two-thirds.
2. The average percentage of failures for all time groups increases with the amount of knowledge of instructions.

An analysis of the records shows that the subjects sometimes responded to other than the stimulus words. The percentage of these irrelevant responses to the total number of possible responses, varied with the group. The amnesic subjects had 1.1 per cent, and the controls had 1.6 per cent.

(3) Speed of Response. We studied the speed of reaction to see whether it varied with the time interval but found that such was not the case. The individuals with the longer time intervals seemed to be quite as prompt as those with the shorter. If anything, the amnesic subjects exhibited a slight increase in speed with the increase in time.

With the crude timing device used it is probable that the absolute time values are not very accurate, but any large difference between two time values is relatively reliable. We thus found that the speed of the response varied with the group. The average time of reaction for the normal subjects was .59 seconds, for the amnesic subjects, .98 seconds, and for the non-amnesic subjects, 1.28 seconds.

(4) Duration of Response. The duration of the response in its relationship to time and to the group was also studied. We found no evidence that the duration varied either with time or with the group. The average duration for all time intervals and for all subjects was approximately 1.5 seconds.

### THE EFFECTS OF PRACTICE

(1) Continuous Practice. All subjects were given three reactions each day; we first analyzed these data to see whether the magnitude of these responses tended to increase with their temporal order. The averages for each of the three reactions for all individuals in the normal and amnesic groups are plotted in Fig. 2. It may be seen that there is no evidence that the magnitude of the response varies consistently with the temporal order. On study of the individual reactions we found that some subjects gave their maximum responses on the first trial, some on the second and some on the third; neither were there any individual differences in this respect.

Since all subjects were given tests over two successive days, we next analyzed the results to see if there was any tendency for the response to be any larger on the second day than on the first. The comparative data of our analysis are given in Table II. We divided the time intervals into three successive groups; the first third contained the zero to ten day intervals, the second third contained the fifteen and twenty day intervals, and the last third

contained the twenty-five to thirty-three day intervals. We computed the average magnitude of each day's responses for the three groups of time intervals and then computed the percentage ratio between the second and first day averages. These percentage values for the two subject groups for the three groups of time intervals are given in the table. Thus, for example, the magnitude of the second day's response of the amnesic subjects is 99 per cent of the magnitude of the first for the first third of the time intervals.

TABLE II

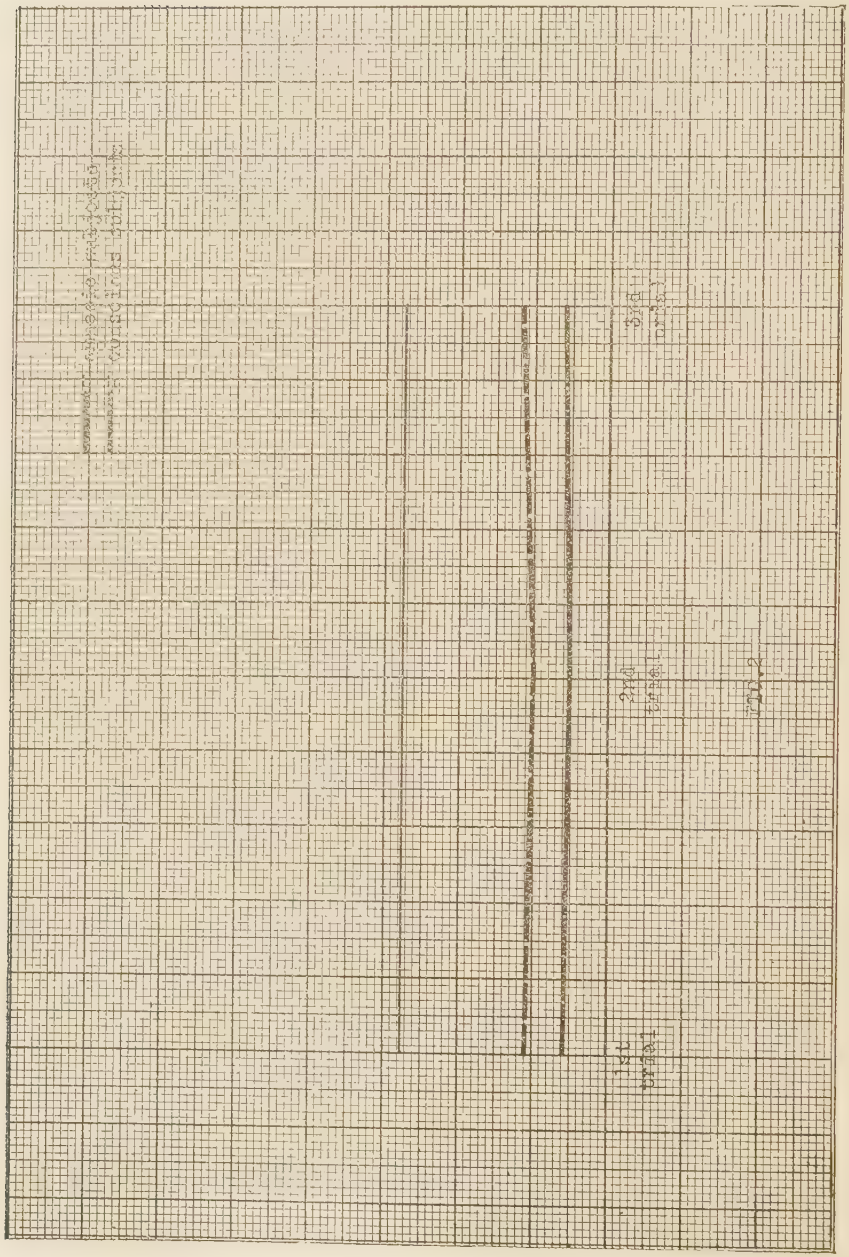
PERCENTAGE RATIOS BETWEEN SECOND AND FIRST DAY RESPONSES

| | Time Intervals | | |
|---|---|---|---|
| Group subjects | First third | Second third | Last third |
| Amnesic . . . . . | 99 | 60.8 | 8.3 |
| Controls . . . . . | 47 | 77. | 194. |

It is evident that the percentage ratio of the second to the first day's responses decreases very noticeably with time for the amnesic subjects, while, on the contrary, it increases very rapidly for the control group. In only one case is the percentage value larger than one hundred, viz., for the last third of the time intervals for the control subjects. This is the only evidence that practice was effective within the first two days' testing.

Since a few of the amnesic subjects were tested continuously for a varying number of days, we made a third analysis of these individual records in order to discover the influence of these amounts of continuous practice. Two subjects with the zero time interval were tested for fourteen days, two with the one day interval were run for seven consecutive days, one with the three-day interval was tested for ten days, two who waited fifteen days were tested for eight days, and one with the twenty day interval for four days. A new list of words with new stimulus words was used on each day. The data are graphically represented in Fig. 3. The heavy solid line is the retention curve as given in Fig. 1, and is included here as a norm for comparison. The broken lines represent the daily records of the individuals who were continuously tested. Thus, for example, the line made up of short dashes represents the average daily magnitude of the responses for the two individuals who were first tested for the zero interval and then continuously for fourteen days.

Two comparisons are possible from the data. First we can determine whether the strength of the reaction tends to increase or decrease throughout the period in which the subjects were



tested, and second, we can compare these graphs with the standard for the whole group, the solid black line. Again referring to the two individuals who were first tested on the zero interval we find that the strength of the reaction tended to increase slightly during the fourteen days on which they were tested, while on the other hand, the magnitude of the response in the standard curve noticeably decreased during that same period.

An examination of these data reveals the following facts:

1. There is no diminution in the magnitude of the reaction with continuous testing; in fact all subjects show a slight tendency to increase the extent of the pressure with continuous testing. This is especially noticeable with the individual starting at the three-day interval. The magnitude of the response very materially increased.

2. There is no evidence that the effects of practice varied with the time interval; in other words, the amount of improvement due to practice is about the same for those tested after the twenty-day interval as for those tested after the zero interval.

3. The improvement due to continuous practice was the more obvious when contrasted with the standard curve. Here the magnitude of the response tends, in general, to fall rather than rise.

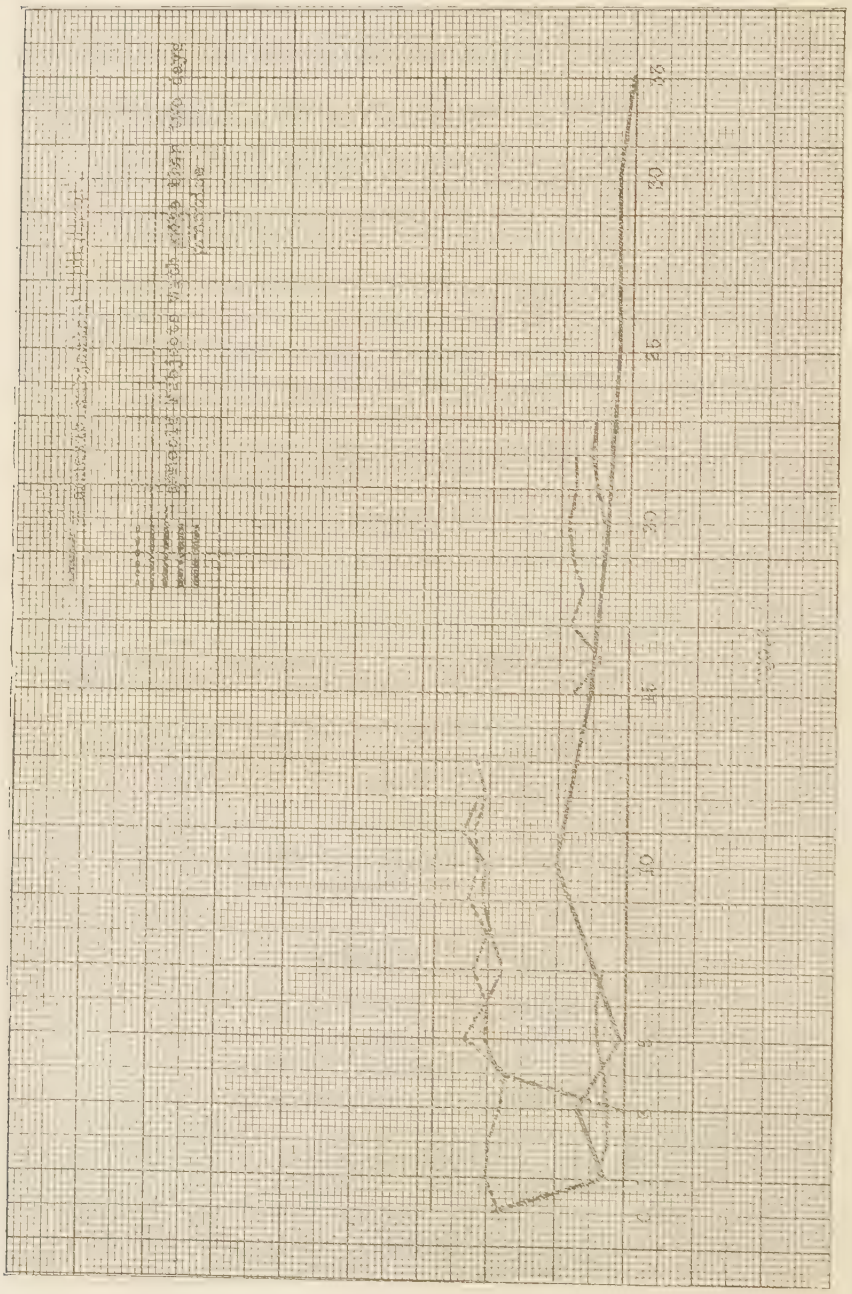
We may, then, make the following conclusions from all these data on continuous practice:

1. There is no evidence of any practice effect within any one day's testing.

2. During the first two days of testing, practice is evident only for the larger intervals, and for the normal subjects. In all other cases the magnitude of the second day's responses was less than that of the first day.

3. Practice, however, consistently exhibited a slight effect for all those individuals who were tested daily for more than two days. Within the limits of this experiment, there is no evidence that the reaction would disappear with continuous testing.

(2) The effect of Hypnotizations on the Magnitude of Response to Subsequent Hypnotizations. After they had completed the series of tests on animals, eleven of the amnesic subjects were then rehypnotized and given instructions to respond to the names of birds. They were tested for retention of this suggestion after varying intervals of time. Two were tested for the two-day interval, two for the three, two for the five, two for the seven, and three for the thirty-day interval, and the average of the two days' responses for these intervals are represented by curve 2 of Fig. 4. Obviously any difference between the height of this curve and the height of the standard curve, also given here, would



be due to the practice effect of the previously suggested response to animals.

Following the completion of this test, ten of the subjects were then rehypnotized and given the suggestion to respond to the names of fruits; they were tested as before. One was tested after a zero time interval, two after one day, two after three, one after ten, and four after fifteen days. Their records are represented by curve 3 of Fig. 5.

Seven of these subjects were now rehypnotized and given the suggestion to respond to flowers. One was tested after the zero interval, two after one day, one after three days, one after four, and two after thirty days. Their records are represented by curve 4.

Finally, five of the subjects were again rehypnotized and given the suggestion to respond to names of numbers. Four were tested after the zero interval and one after fourteen days. These records are represented by curve 5.

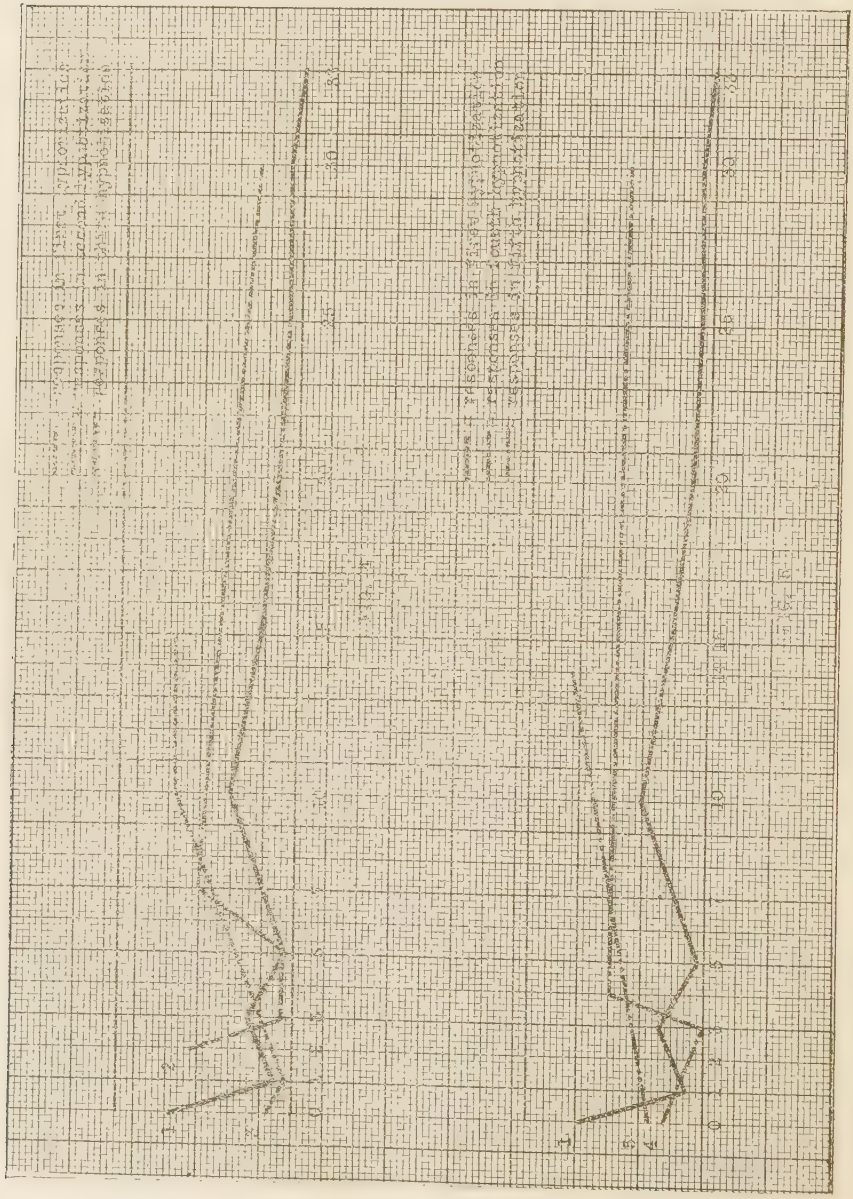
Because of the considerable overlapping of the curves with possible resulting confusion, the results of the first and second rehypnotizations are compared to the standard results in Fig. 4, and the results of the two subsequent rehypnotizations are compared to the standard in Fig. 5. The differences in the height of these various curves for any time intervals are probably due to the number of previous hypnotizations; for example, in curve 5, it is obvious that these subjects have been previously hypnotized four times. In curve 1 there has been no previous hypnotization.

These data, taken at their face value, indicate the following facts. These records for the early time intervals are not much affected by practice in previous hypnotic experiments, but in the longer intervals the magnitude of the response is materially affected. There is a tendency for the magnitude of the response to increase with the number of previous hypnotizations for the longer time intervals.

(3) Effect of Hypnotic Suggestions on the Retention of a Previously Suggested Reaction. After the completion of the successive rehypnotizations, some of the subjects were retested, without rehypnotization, for retention of previous suggestions. These retests were made primarily with the view of discovering how long these suggestions would be retained, but inasmuch as the subjects had been tested in the meantime for other hypnotic suggestions, the duration of retention may be due in part to their influence. Because of the lack of a norm it is impossible to decide to what extent the records indicate the normal retention of the

response, and to what extent it is due to the practice effect of intervening hypnotic tests. However, the records are given for what they are worth.

Eight subjects were retested for retention of the response to animals, two after an interval of two months, three after four



months, two after six months and one after eight months. These retests were made on different lists with different stimulus words from those used in the original testing. It is to be noted that in the interim all subjects had been subjected to at least one hypnotic test for other stimulus words. The results of these retestings are shown in Table III. Here the average of the last two days' responses in the initial test is also given for comparison.

TABLE III

EFFECT OF REHYPNOTIZATION ON RETENTION OF A PREVIOUSLY SUGGESTED RESPONSE TO ANIMALS

| Average magnitude of last two days' response in mm. | Months | Average magnitude of retest response in mm. |
|---|---|---|
| 1.6 | 2 | 0 |
| 3. | 2 | 11.3 |
| 18.15 | 4 | 0 |
| 1.75 | 4 | .35 |
| 6.65 | 4 | 3.2 |
| 8. | 6 | 4.35 |
| 28.85 | 6 | 1.35 |
| 26.2 | 8 | 31. |

Seven subjects were retested for retention of the suggested response to birds. Of the seven who were thus retested, four waited two months, one was tested after three months and two after five months. Again, these subjects had been subjected to several hypnotic tests for other stimulus words in the interim. The results of the retestings are given in Table IV.

TABLE IV

EFFECT OF REHYPNOTIZATION ON RETENTION OF A PREVIOUSLY SUGGESTED RESPONSE TO BIRDS

| Average magnitude of last two days' response in mm. | Months | Average magnitude of retest-response in mm. |
|---|---|---|
| 30.7 | 2 | 21. |
| 13.7 | 2 | 15.7 |
| 2.3 | 2 | .65 |
| 4.65 | 2 | 4.75 |
| 18.15 | 3 | 11. |
| 24.5 | 5 | 0 |
| 26.65 | 5 | 1.85 |

The following facts are revealed by these two tables:

1. The variation of retention with time may be due in large part to variation in amounts of continuous practice in the initial tests. However, the fact that there is a high degree of persistence of response after such long intervals as compared with the small amounts retained in the main experiment after thirty-three days, and the additional fact that in four

cases the magnitude of the response in the retest is greater than the magnitude of the response in the initial test, indicate, in part at least, that the results have been influenced by intervening hypnotization.

2. Under the conditions of this experiment, the amount of retention bears no relation to the increase in the time interval.

3. The magnitude of the retest response, under these conditions, bears no relation to the magnitude of the final response in the initial testing.

## SUMMARY

1. The reactions of amnesic subjects are neither as large nor as persistent as those of the conscious subjects, and they exhibit a somewhat faster decrement with time. Post-hypnotic suggestion endures for at least a month.

2. The reaction time for amnesic subjects is longer than for conscious subjects.

3. Within the limits of this experiment, there is no evidence that a hypnotically suggested reaction would disappear with continuous testing.

4. The magnitude of the response tends to increase with the number of previous hypnotizations for the longer time intervals.

5. Results in retesting are possibly influenced by intervening hypnotization. With intervening hypnotization the response may persist for at least eight months.